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United States Department of Agriculture

ALLEGHENY FOREST EXPERIMENT STATION*

Technical Note No. 23
Forest Service

Philadelphia, Pa.
November 21, 1938

7.154

RELATION OF STUMP DIAMETER TO BREAST-HEIGHT DIAMETER OF NORTHERN HARDWOODS

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The following data on stump diameter in relation to diameter breast high were obtained in 30 to 40-year old second-growth stands of northern hardwoods in the Kane Experimental Forest, Elk County, Pa. Stump diameters were measured with a diameter tape, one foot above the ground, or just below the top of the butt swell if the swell ceased below the one-foot height. This qualification is necessary because chemical wood cutters will cut to the top of the swell even though it be lower than one foot. Because these specifications for point of measurement represent the minimum stump height encountered, they can be applied on any stumps whatsoever, provided measurements are taken at the specified point.

The diameter relationships were tested by Fisher's analysis of covariance method, with the following results:

Measures of the relationship of stump diameter to breast-height diameter for four species

Species	No. of trees	Correlation coefficient	Straight-line regression equation	Error of estimate (inches)
Beech	62	0.991	0.7670X-0.1157	0.84
Black cherry	61	0.996	0.8807X-0.3844	0.52
Sugar maple	78	0.992	0.7699X+0.0774	0.83
Yellow poplar	29	0.995	0.8629X-0.1665	0.99

The correlation coefficients show that a good measure of the stump diameter - d.b.h. relationship was obtained, and that the straight-line regression is a very good expression of the relation. The straight-line nature of the relation was corroborated visually by plotting the field data on graph paper. The errors of estimate show that in 68% of the cases the true d.b.h. is estimated within 1/2 to 1 inch of the actual measurement, depending upon the species. The data for beech agree fairly closely with those published in Technical Note No. 1 of this series.

A statistical comparison between species showed that separate equations must be used for sugar maple, beech, and black cherry, but that one equation may be used for both black cherry and yellow poplar. The data are summarized on the back of this sheet in the form of alinement charts.

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* In cooperation with the University of Pennsylvania.

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CHART FOR CONVERSION OF STUMP DIAMETER TO BREAST-HEIGHT DIAMETER